INNOVATIVE TECHNOLOGICA
METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 4, Issue 3 Mar. 2023

TREATMENT OF CARIES IN CHILDREN: WITHA MODERN STATE, PROBLEMS AND PROSPECTS

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Tooth decay in childhood continues to affect a significant percentage of young children worldwide (in 70-80% of children), which can have serious consequences for dental health and the child's overall health, well-being and possibly intellectual development and are vital to their development.

Caries at an early age is associated with the fact that children do not sufficiently monitor oral hygiene and are not indifferent to sweets. The initial - the stage of the carious spot is characterized by softening and demineralization of the enamel. The surface of the tooth loses uniformity, becomes rough with white or light brown inclusions. At this stage, caries is asymptomatic. Usually the upper front teeth and milk molars are affected. The lower front teeth are affected less frequently. If dental caries is not treated, it progresses and affects the pulp, causing pain and infection, the consequences of which are unnecessary suffering that can be contained with great difficulty by pharmacological agents [1].

Severe early childhood caries associated with hypoplasia (HAS-ECC) - This form of tooth decay mainly affects young children living below the poverty line and is characterized by structurally damaged milk teeth that are particularly vulnerable to tooth decay. These predisposing defects in tooth development are mainly permutations of enamel hypoplasia. HAS-ECC differentiation from other forms of early childhood caries is justified because of its special etiology, clinical manifestations and possible treatment. The HAS-ECC definition has important clinical implications: therapies that control or prevent other types of tooth decay are likely to be less effective in HAS-ECC because the structural integrity of the teeth is compromised before they appear in the mouth. By the time these children go to the dentist, treatment options are often limited to surgery under general anesthesia [2].

The growing "epidemic" of tooth decay roughly correlates with the growing number of children living in poverty and with poor health. It is claimed that

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80% of tooth decay can be detected in 20% of the population, with this 20% being the poorest in the country [3].

The guiding principle for the treatment of a temporary dentition injury is the possible consequences for the permanent tooth. If the risk to the permanent tooth is great, the baby tooth should be removed. If aesthetics bother parents, you can make a number of devices to temporarily solve this problem. It is important that parents understand that the desire to maintain optimal aesthetics at the expense of significant damage to the baby tooth in many cases can lead to even more damage to the permanent tooth. Where there have been breakaways, the old adage "if in doubt, don't think about it" is still perhaps the most reliable advice [4].

There are various methods of restoring carious milk teeth using different materials. Successful restoration of temporary teeth depends on an accurate diagnosis, knowledge of the caries process, knowledge of dental materials and choice of treatment. Radiographs (most often bite) are important auxiliary means for establishing the correct diagnosis of primary caries of molars, without which pathology is likely to be undiagnosed.

There are several main types of dental restoration materials that are used in baby teeth [5]:

•Metal restorations. Silver amalgam.

•Glass ionomer. Traditional glass ionomer cements (self-curing or light-curing - this includes glass ionomer cements of the 1st and 2nd generation); Glass-ionomeric silver-kermet cement; Glass ionomer cements modified with resin.

•Composite resins. Composite resins (light-curing and self-curing).

•Stainless steel crowns. Stainless steel crowns (molar molars and fangs); Stainless steel crowns with prefabricated composite cladding.

•Composites made of resin modified with polyacid (compomers).

GIC glass ionomers can be used as materials for the restoration of temporary molars, which are obtained from organic acids (usually aqueous polymeric acid) and a glass component (most often from fluorolumosilicate glass). These materials are cured by an acid-base reaction initiated by mixing the components.

The advantages of glass ionomer materials include their ability to chemically bind to dentin and enamel through covalent bonds.

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These connections are dynamic, which means that if the connection is broken, a new one can form. Another advantage of materials based on traditional glass ionomers is their biocompatibility [6].

The absorption and release of fluorine is another important advantage of GIC. Fluorine is used as a flux in the production of the glass powder component of GIC. It is gradually leached out of the hardened cement over the first few months. After that, the installed GIC is able to absorb more fluoride from the oral cavity, which is then gradually leached out of the material, apparently for as long as the restoration remains in place. Thus, GIC reduction acts as a reservoir of fluoride. However, conventional GICs exhibit relatively low compressive and tensile strengths compared to other materials. Surface roughness, relatively low color stability, and low wear resistance can also be a problem. These factors have been shown to adversely affect the clinical efficacy of conventional GIC restorations. . Conventional GICs have been shown to perform poorly when used as restorations with two surfaces (Class II) on temporary molars [7].

Resin-modified glass-ionomeric cement (RMGIC) was introduced to dentistry in the late 1980s in an attempt to improve the properties of glass ionomers. RMISCs are glass ionomer cements in which small amounts of monomer are included together with initiators involved in the polymerization reaction. RMGIC have the desirable properties of conventional GICs (adhesion to tooth tissue, fluorine release, biocompatibility and a reasonably good aesthetic appearance), while the addition of monomer and polymerization initiators gives the materials a higher fracture viscosity, better wear resistance and aesthetics. higher resistance to moisture. With some RMGIC it is possible to obtain the initial photopolymerization of the material under the influence of visible light, and the subsequent curing of the material occurs due to the acid-base reaction [8].

Hubel and Mejàre published the results of a randomized, prospective, three-year mouth-split study that compared the clinical characteristics of conventional GIC (Fuji II) and RMGIC (Vitremer) for Class II restorations of milk molars. 16 They found that cumulative success rates at 36 months were: Vitremer RMGIC = 94% and Fuji II Conventional GIC = 81% ($P < 0.05$), the difference is statistically significant. The authors noted that the risk of failed restoration was more than five times higher when using conventional GIC

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METHODICAL RESEARCH JOURNAL
ISSN: 2776-0987 Volume 4, Issue 3 Mar. 2023

(Fuji II) than when using RMGIC (Vitremer) as a restoration material [9].

In a systematic review of the literature, Chadwick and Evans compared Class II restorations in milk molars using conventional GIC and resin-modified RMGIC. 15 They found that conventional GICs perform poorly (failure rate 6.6–60%) compared to RMGIC (failure rate 2–24%). class of milk molars. However, they noted that the evidence supports the use of RMGIC for Class II restorations of small and medium size [10].

For treatment without removal of carious tissue, *Hall's method* showed less ineffective treatment of proximal carious lesions compared to complete removal of caries (CCR) and filling. In the treatment of deep carious lesions, selective removal of caries (SCR) methods showed a decrease in the frequency of pulp exposure. However, the advantage of SCR over CCR in terms of pulp symptoms or recovery success/failure has not been confirmed. There has been controversy about the use of the Hall (HT) technique and whether it can be considered as a standard treatment for carious milk molars. The MEDLINE, Embase, CENTRAL and Epistemonikos databases searched for clinical studies conducted from 2007 to 2021 to assess the TC of primary teeth. Two reviewers independently screened, extracted data and assessed the quality of the studies.

Eleven publications from eight unique studies were included. As a result, four studies had a low overall risk of bias, and five studies were included in the meta-analysis. Overall, the success rate (HT) was 49% (RR 1.49 [95% CI: 1.15–1.93], I2=89.5%, p<0.001). Compared to direct restorations, the success rate of HT was 80% higher; while similar success was found compared to conventional pre-molded metal crowns. Also 6-fold (RR 0.16 [95%CI: 0.10–0.27], I2=0%, p<0.001) less likely to fail. Most studies included proximal or multisurface lesions.

The results of the study concluded that HT is a successful method of treating caries of milk teeth, especially proximal or multisurface dentin lesions. It is well tolerated by children and acceptable to parents, mild side effects are reported. The Hall technique is not only a predictable restoration option, but also significantly superior to the traditional method of treating carious milk molars. The effectiveness of the Hall method is 5 times higher, than traditional recovery methods [11].

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Despite advances in restorative dentistry and the sciences of dental materials, a restoration installation usually requires tooth preparation. Preparation of teeth for deeper lesions requires the use of local anesthetics, can expose the pulp of the tooth and lead to a structural weakening of the tooth structure. Sometimes the baby tooth is already too compromised (especially in cases of multisurface caries) at the time of treatment, which complicates the recovery procedure, especially in young and mostly anxious patients.

Pre-molded metal crowns have demonstrated significant clinical success and are considered a favorable restoration option for moderate to severe caries with damage to two or more surfaces of milk molars. Installing a stainless steel crown is sometimes challenging as it requires collaboration with the patient, which is difficult to achieve in children.

In order to simplify the procedure and make it accessible to patients, Dr. Hall has developed a method for installing stainless steel crowns in children that does not require local anesthesia, tooth decay removal, or any tooth preparation. This method is based on scientific evidence that the progression of caries stops after an effective marginal fit is achieved. A properly installed stainless steel crown eliminates cariogenic bacteria in an environment that promotes acid demineralization of inorganic and proteolytic breakdown of the organic component of the tooth structure. Randomized controlled trials conducted to evaluate the effectiveness of the Hall (HT) technique showed favorable results [12].

Crowns for milk molars are pre-molded and come in different sizes and materials that can be worn on decayed teeth or teeth with developmental defects. They can be made entirely of stainless steel (known as "pre-molded metal crowns" or POMCs) or, to improve aesthetics, can be made of stainless steel coated with white veneer or made entirely of white ceramic material.

In most cases, the teeth are trimmed under the crowns to install them in the usual way using local anesthesia. However, in the case of the Hall technique, POMCs are pushed over the tooth without local anesthesia, removal of carious tissue, or tooth preparation. Crowns are recommended for the restoration of milk molars that have undergone pulp treatment, severely destroyed or severely destroyed. However, few practicing dentists use them in clinical practice.

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ISSN: 2776-0987 Volume 4, Issue 3 Mar. 2023

Four studies compared crowns with fillings; two of them compared conventional pre-molded metal crowns with open sandwich restorations, and two compared pre-molded metal crowns installed using *hall techniques* with fillings. One of these studies included a third group that compared pre-molded metal crowns. (installed using the Hall technique) with non-restorative treatment of caries. In two studies using crowns installed by the traditional method, all teeth underwent pulpotomy before the crown was placed. The final study compared two different types of crowns: pre-molded metal crowns and aesthetic stainless steel crowns with white veneers. No randomized controlled trial data were found that compared different methods of installing pre-molded metal crowns (i.e., the Hall method compared to the traditional method) [13].

Crowns against fillings. All studies in this comparison used molded metal crowns. One study reported short-term results and found no reports of serious failure or pain in any of the groups. There was moderate-quality evidence that the risk of serious failure was lower in the long-term crown group (hazard ratio (RR) 0.18, 95% confidence interval (CI) 0.06 to 0.56; 346 teeth in three studies, one routine and two on the Hall technique). Similarly, there was moderate-quality evidence that the risk of pain was lower in the long term in the crown group (RR 0.15, 95% CI 0.04 to 0.67; 312 teeth in two studies). Discomfort associated with the procedure was lower for Hall-defined crowns than for fillings (RR 0.56, 95% CI 0.36 to 0.87; 381 teeth) (moderate quality evidence).

One study with a split mouth (11 participants) compared molded metal crowns with aesthetic crowns (stainless steel with white veneers). They provided very low-quality evidence, so no conclusions could be drawn.

At the end of the study, it was concluded that crowns placed on milk molars with carious lesions or after pulp treatment are likely to reduce the risk of serious failure or pain in the long term compared to fillings. Crowns installed using the Hall technique can reduce discomfort during treatment compared to fillings. The quantity and quality of evidence for crowns compared to non-restorative caries and for metallic ones compared to aesthetic crowns is very low. There are no randomised controlled trials comparing crowns installed in the traditional way using the Hall technique [14].

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There is evidence that the use of certain doses of xylitol can be effective in stopping the caries of primary teeth. However, quantitative synthesis could not be carried out due to the clinical and methodological heterogeneity of the included studies.

A low-risk study found that daily use of xylitol wipes is a useful adjunct for caries control in young children, however, this finding should be interpreted with caution as this study had a very limited sample size. Chlorhexidine and CPP-ACP may be more effective than placebo in treating tooth decay, but their effectiveness borders on fluoride. Mint confectionery containing arginine and lacquer with a triclosan content of 0.3% were found to reduce the development of caries of milk teeth, but the data were at high risk of bias. To make definitive recommendations, high-quality randomized controlled trials are needed.

Studies using non-fluorinated agents such as arginine, chlorhexidine, xylitol, casein phosphopeptide-amorphous calcium phosphate and bioactive glass in any form were included, which were compared with placebo and/or fluoride. No restrictions were imposed on the dose, frequency, duration or route of administration of petroleum agents.The primary result of the studies was an increase in caries of primary teeth or a change in the proportion of participants who developed new caries of primary teeth. A secondary result was side effects from the use of fluoride agents, such as gastrointestinal complaints, pain and discomfort, tooth staining, poor oral hygiene, quality of life, and patient satisfaction [15].

Recently, the use of simple non-surgical approaches to manage the situation of caries in children has been promoted. For example, three studies reported that topical application of silver diamminfluoride (SDF) solution can stop dentin caries in preschool children. One study confirmed that daily brushing of teeth in a kindergarten using toothpaste containing fluoride of 1000 parts per million can stabilize the situation with caries in young children. There is limited data confirming the effectiveness of SDF use. or daily brushing of teeth with fluoride toothpaste in stopping or slowing the progression of active dentin caries of primary teeth in preschool children. More well-designed randomized controlled trials are needed to confirm these findings [16].

By stopping and preventing tooth decay, SDF offers an alternative way of caring for patients for whom traditional restorative treatment is not available

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immediately. Current data from controlled clinical trials involving more than 3900 children show that two-year use of SDF reduces the progression of current and the risk of subsequent tooth decay. This commentary presents the best data from systematic reviews and clinical trials to clinicians may have considered the benefits, risks, and limitations of SDF therapy in young children.

Fluorinated varnish is used primarily to prevent tooth decay on smooth surfaces and remineralize early enamel lesions. Conversely, SDFs are used primarily for obvious carious lesions. Therefore, their combinatorial use may be additive or synergistic, and this has yet to be determined. One possible solution is to alternate their use with an interval of three months. More than 88 percent agree that SDF can be used to stop tooth decay in patients at high risk of developing milk (87 percent agree) and permanent (66 percent agree) teeth. More than 90 percent agree that SDF will be useful in treating patients who have difficulty receiving traditional treatment (e.g., preoperative, behavioral, or medically unstable). Paradoxically, Less than 50 percent agree that SDF will be useful for preventing tooth decay in initial lesions. Thus, SDF appears to be a useful immediate treatment for children who cannot receive traditional restorative treatment for tooth decay. It is effective at stopping tooth decay and preventing new lesions on the teeth where it is applied, and is a minimally assisted treatment that is safe and affordable.

Given the above, it can be expected that SDF will be widely applied to combat tooth decay to meet the needs of our patients, as well as the national goals of both the Affordable Care Act and the Institute of Medicine's quality goals [17]. Fluoride food additives were first introduced to provide systemic fluoridation in areas where water fluoridation is not available. Since 1990, the use of fluoride supplements for the prevention of tooth decay has been revised in several countries.

A review of 11 studies involving 7196 children is known. In permanent teeth, when fluoride supplementation was compared with no fluoride supplementation (three studies), the use of fluoride supplementation was associated with a 24% (95% confidence interval (CI) of 16 to 33%) reduction in carious, absent, and filled surfaces. (D(M)FS). The effect of fluoride supplementation on milk teeth was unclear.

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In one study, the caries-inhibiting effect on milk teeth was not observed, while in another study, the use of fluoride supplements was associated with a significant reduction in tooth decay growth.

This review suggests that the use of fluoride supplements is associated with a reduced increase in tooth decay compared to the lack of fluoride supplements in permanent teeth. The effect of fluoride supplementation on milk teeth was unclear. Compared with the local application of fluorides, no differential effect was observed. When fluoride supplements were compared with topical fluorides or with other preventive measures, there was no difference in effects on permanent or milk teeth.The review found limited information on side effects associated with the use of fluoride supplements. 10 trials were rated as having an unclear risk of bias and one trial with a high risk of bias, and therefore the trials provide weak evidence for the efficacy of fluoride supplementation [18].

Conclusion

By conducting all the above recommendations in a disciplined manner, the carious process can be stabilized. That is, the initial lesions are remineralized, as a result of which the enamel shines in the area of white spots; the development of carious defects is suspended; the affected hard tissues are compacted. To do this, you need to advise mothers on the prevention of dental caries, including the formation of oral hygiene of the child, food hygiene. It is also necessary to teach children rules of personal oral hygiene.

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